SOIL CONSERVATION DIGEST

CALIFORNIA - NEVADA REGION

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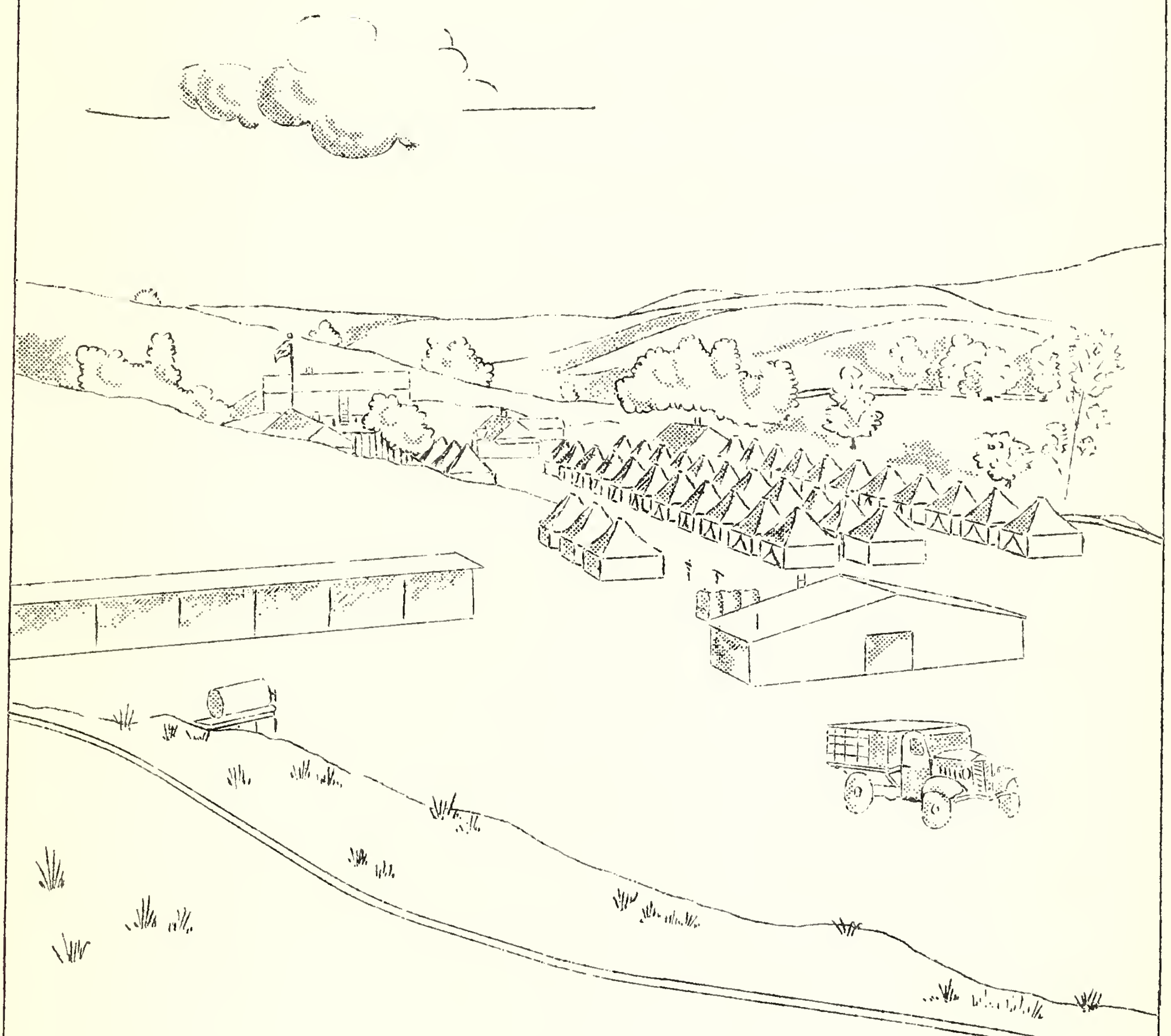

MOORPARK CAMP - S.C.S. CAL. NO. 1
LOOKING EAST
LAS POSAS DEMONSTRATION AREA
VENTURA COUNTY

J.H.G.

U. S. DEPT. OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CONSERVATION DIGEST - CALIFORNIA-NEVADA REGION NO. 10
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NOTED CHINESE AGRICULTURIST VIEWS SCS PROJECT

China is generally accepted as the example par excellence of the extent to which uncontrolled erosion may ruin a country. The correlation between the color of the Yellow Sea and the floods and famines so prevalent in China has received publicity during the last few years. At the same time, however, one reads that the Chinese were masters of the art of terracing thousands of years ago.

This paradox has troubled us for a long time, and only recently did we find a satisfactory answer. Dr. T. Y. Tang, dean of the College of Agriculture of Sun Yat Sen University in Canton, China, toured the Las Posas area recently and, on being questioned concerning this problem, explained it in the following manner:

About 5,000 years ago the Chinese inhabited the rugged country in what is now the northwestern part of China. Even in these early times the farmers used terraces and other methods of erosion control to maintain the productivity of their lands. Because of the rugged terrain and rigorous climate, farming was difficult at its best, and gradually the more adventurous and ambitious farmers moved toward the better conditions in the southeast, carrying the more advanced agricultural practices with them. The easy-going farmers remained behind and took what they could from the soil with the least effort. Terraces were permitted to disintegrate and virgin soil was broken without provision being made for its protection against erosion.

Throughout the thousands of years of this migration soil conservation has been practiced by those who went ahead, and neglected by those who stayed behind. Since the number of progressive farmers was comparatively small, the greater part of China has suffered severely from erosion. At the present time it is only in the southeast, where the migration has stopped, that the lands are generally protected with terraces, ditches, and strip-crops. Efforts are now being made to move the better farmers back toward the northwest so that once again soil conservation will be carried out on those steep lands from which little or nothing is produced except floods and debris.

By -- Ralph W. Netterstrom, Junior Agriculturist.

WHAT COST EROSION CONTROL?

-By-

Roy T. Caldwell
Project Superintendent
Corralitos Creek Project WP-2

How many farmers, fruit growers, and land owners have asked themselves this question, "What Cost Soil Erosion Control?" Not until recent years has the seriousness of the problem of erosion been considered by the American farmer. Only a generation back it was possible for a family to leave the old homestead, when it became unproductive from erosion, and move on to some new locality and acquire new lands. To these farmers the problem of soil erosion, if it was considered at all, was taken as a matter of course. Today the American farmer is faced with changed conditions. There are few, if any, new lands to develop; productive agricultural lands are becoming more difficult to acquire. The land owner is becoming aware of this changed condition and is today more actively interested in any measures to protect his land. He is becoming acutely aware of the loss in productivity and value of his land by the soil's worst enemy, "Erosion," and again the question, "What Cost Erosion Control?"

From the view-point of a trained Soil Conservationist there are no two farms identical. Several factors enter into recommendations for erosion control methods, such as, steepness of slopes, type of soil, and variety of crops on the land. Assuming he has recommended the best known control methods for a farm, then the farmer will, of necessity, have to estimate the cost. How much, he will reason, could be spent on this farm for erosion control and still make that expenditure count as a good investment. "What Cost Erosion Control?" is an important question and it needs careful consideration by every farmer and land owner.

The value of agricultural land is determined by the return from the crops it produces. Paying crops cannot be produced indefinitely on lands subject to erosion. The topsoil must be held in place to retain productivity. In nearly every agricultural section some land is cultivated at a loss. This land could be retired from cultivation and restored to pasture and timbered areas and produce some returns. There are cultivated lands bearing crops now, that without application of erosion control measures will, in a few years, cease to pay. With effective erosion control the lands can be made to produce profitable crops indefinitely. Naturally the amount of expenditure that can be judiciously made on a farm or tract of land can only be determined by the value of the crops it produces. With this consideration one may assume that with effective, permanent erosion control established, an annual yield from the farm or tract of land can be reasonably expected to equal that of the average year and to continue on over a long period. Without the protection of erosion control methods the annual yield on any lands subject to the destructive forces of erosion is certain to decrease. If the land is in orchard, and especially those on slopes, the

rich topsoil is gradually washed away, leaving the less fertile subsoils containing a very small amount of humus and nutriment for the trees and, naturally, the yield is less and less. Grain lands and cultivated crop lands suffer equal losses from erosion and in many instances the percentage of loss is even greater where no cover crop is maintained during the rainy season.

The basis on which the land owner is to estimate his expenditure for erosion control should be considered for a long term of years. In other words, his expenditures will be returned not in one year or five, but in a long period of sustained productivity of his lands. A comprehensive control program not only protects sloping lands from soil washing but keeps the lower lands from being covered with silt and debris.

Shall the land owner allow this annual decrease in yield per acre from soil erosion, or shall he through some expenditure for effective permanent erosion control methods, establish on his lands a sustained productivity? Then the question confronting the land owner in erosion affected areas is, "What Cost Erosion Control?" What is a sustained productivity of the land worth? If, as it is well agreed, it pays to fertilize land, certainly it will pay even more to protect the topsoil and the fertilizer placed on that land from washing away. Erosion control cannot be ignored if the annual yield is to be maintained.

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STRUCTURAL FEATURES OF EROSION CONTROL

-By-

Robert W. Smith
Junior Engineering Aide
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The most tangible features of soil conservation are usually those which are a part of physical construction. Because in most cases these features are designed to be permanent, they are also the most costly, hence their design and efficiency is of great importance in analyzing the balance sheet of erosion control.

<u>Structures used in soil conservation work in the Northern California District may, broadly speaking, be divided into three groups; structures carrying water, structures used to stabilize water channels, and miscellaneous structures designed to aid the farmer in maintaining his work schedule.</u>

The importance of the first group of structures is almost self-evident. The chief purpose of soil conservation is to so control runoff that erosion is reduced to a minimum. Some sort of channel is essential if the runoff is to be controlled, the exact type being dependent upon the quantity of water to be carried and on such factors

as soil type, land slope, and land utilization.

There are two general classes of channels in use in the Northern District; surface drainage channels, which are designed to prevent sheet erosion, and diversion ditches which collect the water from the surface channels and carry it into natural water courses which have been stabilized. The surface drainage channels may take the form of contour ditches or terraces; contour ditches are much smaller than terraces and more adaptable for use on steep hillsides and in orchards. Two types of contour channels are found in the Northern District; annual ditches, which are plowed by the farmer after his crops have been gathered and before the winter rains have started; and permanent ditches, which are larger in size and capable of carrying the runoff from a considerable area.

Diversion ditches which collect the water from these surface channels are necessarily permanent in character. Wherever the grade is sufficiently low to permit their use, unlined ditches have been found most desirable because of the greater economy of construction. If the available grade is excessively high so that the flow would cut into the channel of an unlined ditch, some means of stabilization must be employed or a lined channel utilized.

The lined channels in use in the Northern District fall into three classes; open trapezoidal channels made of reinforced concrete or stone flags, open half-circle ditches made of plastered cement with wire mesh reinforcement, and cement pipe lines. Open channels are somewhat cheaper to construct and may be adapted to flatter grades than the pipe lines, but interfere with cultivation, frequently requiring expensive bridges to permit crossing by farm equipment without damage to the ditches.

Use of a pipe line is limited, however, to a grade sufficiently steep to insure self-cleaning velocities even in period of low flow. Safe design in the Northern District is based on a minimum velocity of five feet per second when the pipe is flowing one-third full. Smaller velocities are apt to lead to disastrous situations in cases of abnormal soil content in the drainage water. Where the grade is sufficient to maintain safe velocities, however, the pipe line, sunk low enough to provide at least a two foot covering, permits easy land cultivation and is not excessively high in cost when compared with open trapezoidal ditches.

One other type of structure which plays an important part in channel construction is the transition structure between various kinds of ditches. Most common are the transitions from lined to unlined channels. Structural classifications which have been used in the Northern District include half-circle drops, stilling basins, and hydraulic jumps.

Half-circle drops are usually employed where the artificial channel empties into a natural channel and are designed to carry the flow far enough beyond the bank to prevent under-cutting. Stilling basins and hydraulic jumps are structures designed to economically dissipate the energy due to excessive velocity head which would cause serious erosion in an unlined channel if uncontrolled. The design conforms to

approved standards of the Reclamation Service as well as extensive model tests by members of the staff of the S.C.S. in the Northern District.

One other type of transition in use, a Parshall flume, has a two-fold purpose. In addition to serving as a connection between two kinds of channels, it serves as a measuring device for recording channel flow and will be extensively used in hydrological work.

Transitions leading from unlined ditches are less important and are somewhat simpler in design because of the lower water velocities encountered. Outlets leading from contour ditches into diversion channels are frequently designed as little more than a plastered lip extending from the diversion ditch; half-circle drops have been employed where the contour channel empties into gullies or natural water courses.

Perhaps the least noticeable type of transition is that between two unlike sections of lined channel, such as that which might be used where a trapezoidal concrete ditch empties into a pipe line. Careful hydraulic design is most essential for such structures, since a minimum loss of head is necessary to prevent breaking up of the flow and to permit the greatest economy in the design of the pipe line.

The second group of structures found in erosion control work in the Northern District is that used to stabilize channels, either natural or artificial. While quite dissimilar in appearance, the various types have one common action--to serve as stabilization dams in maintaining the desired grade and form of the drainage channel.

Four types of material have been employed in construction: wood, which has been used for collars for broad open channels; reinforced concrete or masonry rubble, which has been used for collars and drops; and pipe and wire, which has been used in stabilization dams and as side revetments. While the latter is probably the least permanent type of construction, its use is frequently justified in gully control where the final stabilized grade is expected to be somewhat higher than that found at the time of construction.

Masonry rubble construction is not generally feasible except in regions where there is an abundance of material. In such regions, gravity type structures are much more economical than reinforced concrete.

In every case a vegetative covering is used wherever applicable in connection with mechanical structures.

Where open channels are used in erosion control work, provision must be made occasionally for crossings in order that the cooperator may have access to all of his land. These structures form the third group used in the Northern District and consist of bridges, culverts, and fords. The first two types are the most expensive but are frequently essential where heavy farm equipment is in constant use. Small timber bridges have been extensively employed, the load factor being determined by such tractor equipment as the farmer may possess.

Physical construction features - tangible features of soil conservation - have proven extremely effective in advertising the work of the S.C.S. Much interest has been aroused in farmers who have observed the construction details which, of course, are only a part of our coordinated program in the various projects of the Northern District. Care in details of construction has been more than repaid by the good will resulting.

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AUSTRALIAN SALTBUSH

-By-

Milton R. Bell, Camp Palos Verdes
(Formerly Agronomy Foreman)

Description: Australian saltbush (Atriplex semibaccata) is a semiwoody, prostrate perennial forming a dense, mat-like rosette 6 to 12 inches thick and from 18 inches to several feet in diameter. The leaves are linear, about one inch long, and coarsely toothed along the margins. Reproduction is from seed, which are small and enclosed in a pair of fleshy foliaceous bracts which become red as the fruit matures.

History: This saltbush was introduced into California from its native habitat, Australia, some 40 or more years ago. It has become naturalized in California, where it is reported as being confined to the coastal regions south of San Francisco and to the upper San Joaquin Valley, centering about Tulare and Bakersfield. The northern limit observed (1919) was Hollister, California. Australian saltbush appears to have done best in Los Angeles and San Diego counties, especially along the immediate coast in the fog belt. From general observations it seems to be confined to areas with somewhat favorable soil-moisture conditions. According to reports it is not found on extremely dry areas, either at lower levels or higher elevations.

While this saltbush has the reputation of growing on practically all types of soil, it prefers an alkaline soil and is seldom found where acid soil prevails.

It is quite drough resistant, but apparently not to the extent of some other species of Atriplex and many desert plants.

Value: The high salt content of Australian saltbush makes it less palatable than most ordinary forages, but it is eaten readily by sheep, goats, cattle, and horses when other feed is scarce. It is of greatest value when supplemented with other feeds. It can be used as a soiling crop, but has little value as hay.

Soil Conservation Adaptation: Because of its habit of growth and the protective mass of vegetation with which it can mantle an eroding surface, Australian saltbush appears to be an especially valuable means of stopping erosion. It can also be used as a temporary means until larger shrubs and trees can reach sufficient size to be of value. This plant is being used in southern California to seed gully banks after the latter have been sloped.

Seed and Vegetative Reproduction: It is reported that, under favorable conditions, about 300 pounds of seed can be secured from an acre. Harvesting the seed is rather slow and expensive, due to the prostrate habit of the plant and the ease with which the seeds fall off when disturbed. For this reason it does not seem practicable to attempt to harvest the entire plant for subsequent removal of the seeds. However, for the purpose of securing seed for erosion control plantings it should be profitable to produce in the more favorable regions.

Eradication: Since the plant has but a single tap root, easily removed from the soil, it may be kept in check by clean cultivation.

* * *

- PERSISTENT EFFORTS WIN -

(From Ventura County Star)

"It is easy enough to do a great deal of hard uphill work if the populace keeps standing around telling you what a great man you are while you are doing it. It is ever so much harder to keep plugging away without recognition, sticking on a thankless job whose importance hardly anyone but yourself ever realizes.

"But some of the most important work in the world is done in precisely that way. And once in a while the chap who is doing it does come through, at last, to the recognition and the broadened opportunity which he deserves.

"There is the case of Hugh Hammond Bennett. Bennett has been in the U.S. Department of Agriculture since 1905, or thereabouts. Away back in the early years of the present century he awoke to the menace of soil erosion and discovered that we were using our soil so carelessly that we would ultimately ruin rich farm areas which have helped to make us a great and powerful nation.

"So Mr. Bennett undertook a campaign to remedy matters. For many long years he toiled unheeded in the Department of Agriculture, striving to bring about a saner use of our land. He did it so long, without any recognition, that he must have felt sometimes as if his work were utterly useless.

"But finally the government and the nation awoke and installed a soil erosion service with 21,000 employes and ample funds and publicity to carry the fight to victory. Ventura county, scene of one of the important federal projects, is well aware of its importance.

"And the man who was put in charge of this vast job was Hugh Hammond B ennett."

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DEPARTMENT OF AGRICULTURE
SOIL ~~EROSION~~ Conservation SERVICE
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